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## Specification

## Printing Press and Method for Printing Two Webs

The invention relates to a printing press and to a method for imprinting two webs in accordance with the preambles of claims 1 or 11.

A printing press is known from DE 100 15 703 A1, wherein two webs are conducted back to back through several double printing groups and each is imprinted on one side. Each web can be conducted around respectively one of the double printing groups, which permits the imprinting of the other web on both sides.

It is known from DE 41 04 135 A1 to conduct a web in a double printing group between the forme and transfer cylinders, as well as between the two transfer cylinders, and to imprint one side of the web by means of the forme cylinder by the so-called direct lithographic process, as well as by means of the offset method by the transfer cylinder of the second printing group.

DE 18 27 845 U shows a web which is selectively conducted between two transfer cylinders, or between one transfer cylinder and an associated forme cylinder.

A web guidance through a printing press is known from CH 657 313 A5, wherein each one of two webs is imprinted in accordance with a direct printing process at several printing positions constituted by transfer cylinders and forme cylinders. In this mode of operation the transfer cylinders of neighboring printing groups are disengaged from each other, the webs are guided through the printing positions separated from each other.

A printing press for the simultaneous imprinting of two webs is known from EP 0 919 373 A1, wherein two webs are conducted back to back through double printing groups and are imprinted on one side. Thereafter, each one of the webs is individually imprinted on one or both sides by respectively further offset printing groups.

The object of the invention is based on providing a printing press and a method for imprinting two webs.

In accordance with the invention, this object is attained by means of the characteristics of claims 1 or 11.

The advantages which can be obtained by means of the invention lie in particular in that it is possible, without a large additional outlay for technical installations, to considerably increase the productivity in connection with certain products, for example to double it. This is the case in particular if at least one side of the web only needs to be singly imprinted, i.e. in only one color.

The device and the method can be employed in particular if it is intended to imprint a web on one side in four colors, for example, and the other side in one color.

With the arrangement of four double printing groups for rubber-against-rubber operation, for example in the form of two H-printing units, the two printing groups of a fifth double printing group are embodied in such a way that they can be operated as offset printing groups during rubber-against-rubber operation, as well as each individually with the direct printing method.

The printing press is of particular advantage if the double printing group intended for direct printing is arranged as an additional printing group, and is for example

also suitable for a one-sided or two-sided flying plate change.

Exemplary embodiments of the invention are represented in the drawings and will be described in greater detail in what follows.

Shown are in:

Fig. 1, a first exemplary embodiment of a printing press,

Fig. 2, a second exemplary embodiment of the web guidance in the printing press,

Fig. 3, a third exemplary embodiment of the web guidance in the printing press.

A printing unit of a printing press, in particular of a web-fed rotary printing press, has a first double printing group 01, wherein a web 06, 07, or two webs 06, 07, for example two webs 06, 07 of material, in particular paper webs, can be conducted back to back between two cylinders 03, 04 forming a printing gap 02. The webs 06, 07 are being rolled off roll changers 05, for example.

In the example, the two cylinders 03, 04 forming the printing gap 02 are embodied as transfer cylinders 03, 04, in particular as rubber blanket cylinders 03, 04, to each of which a further cylinder 08, 09, for example a forme cylinder 08, 09, has been assigned. Inking, and if required dampening units, not represented, are provided. However, possibly one of the two cylinders 03, 04 forming the printing gap 02 can be embodied as a counter-pressure cylinder 04, 03 which does not conduct printing ink, for example as a satellite or steel cylinder, but as a result of which one of the webs 06, 07 cannot be imprinted in this printing gap 02.

The four cylinders 03, 04, 08, 09 of the printing group 01 embodied as a double printing group 01 are rotatably seated with their front ends in a frame, not represented. Here, at least one of the two transfer cylinders 03, 04 is seated in such a way that it is possible to provide a relative positional change of the two transfer cylinders 03, 04 in respect to each other, in particular a change of a distance between the two transfer cylinders 03, 04 for printing operations, for adapting to the now double web width. For this purpose a stop which defines the print-on position of the two transfer cylinders can be designed to be adjustable, or a second, additional stop can be moved into the actuating path of at least one of the two transfer cylinders 03, 04.

In the exemplary embodiment (Fig. 1), the printing press has four double printing groups 01 designed corresponding to the first double printing group 01, which are embodied, for example, in the manner of two H-printing groups arranged on top of each other. The double printing groups 01 can also be 4, or 5 or 6 (bridge) printing units arranged on top of each other.

The two webs 06, 07 can be imprinted in the printing gap 02 of the first double printing group 01, or of the first four printing groups 01, respectively on one side, for example fourfold (symbolically represented by triangles in Fig. 1). Downstream, viewed in the running direction of the webs 08, 07, of the first double printing group 01, or the first double printing groups 01, at least one further double printing group 11 with a printing gap 12 and two printing groups 13, 14 is provided, in which selectively one of the

webs 06, 07 can be imprinted in the printing gap 12 on both sides, or both webs 06, 07 can be imprinted back to back on one side, as in the first double printing group 01 or, in a third mode of operation, both webs 06, 07 can be simultaneously imprinted on the side which had not been imprinted in the first double printing group 01.

In the last mentioned mode of operation, respectively one of the webs 06, 07 can be conducted between a cylinder 16, 17 designed as a transfer cylinder 16, 17, and the associated cylinder 18, 19, respectively designed as forme cylinder 18, 19, and respectively one side can be imprinted by the respective forme cylinder 18, 19 in accordance with the so-called direct lithographic process in printing gaps 21, 22. Even if in this mode of operation the cylinder 16, 17 functions as a counter-pressure cylinder 16, 17, and not as a transfer cylinder 16, 17, it is advantageously designed as a transfer cylinder 16, 17 in order to assure the two first mentioned modes of operation for the indirect printing method.

In the area of the double printing group 11 for the direct lithographic process, the printing press has, at least on one side, means 23, for example guide elements 23, such as for example rollers 23 or air-bathed guide rods 23, by means of which at least one of the two incoming webs 07, 06 can be conducted around the forme cylinder 18, 19 of the double printing group 11 located on the side of this web 06, 07. On the other side of the double printing group 11 means 24 are arranged, for example rollers 24 or air-bathed guide rods 24, by means of which the other, exiting web 06, 07 can be guided

around the forme cylinder 18, 19 of the double printing group 11 located on this side of the web 06, 07 (Fig. 1).

However, as represented in Figs. 2 and 3, it is also possible to conduct the two webs 06, 07 in the same way around the respective forme cylinder 18, 19 before they are conducted into the printing gap 21, 22 (Fig. 2), or after they have left the printing gap 21, 22.

It is possible in both cases to keep the direction of rotation of the cylinders 16, 17, 18, 19 of both printing groups 13, 14 required for the modes of operation first mentioned above, which can be advantageous, for example in connection with planographic printing with the use of ink and dampening agents.

In an advantageous embodiment, the transfer cylinders 16, 17 of the two printing groups 13, 14 of the double printing group 11 which can be operated in accordance with the direct lithographic process are embodied so that they can be spaced apart from each other sufficiently far so that in the third mode of operation the two webs 06, 07 do not touch in the printing gap 12. For this purpose, a stop defining the print-on position of the two transfer cylinders can be designed to be adjustable, or a second additional stop can be brought into the actuating path of at least one of the two transfer cylinders.

In an advantageous manner means are provided which selectively limit the spacing between the transfer cylinders 16, 17 and the associated forme cylinders 18, 19 in this mode of operation. These can again be an adjustably designed stop, which defines the print-on position of the cooperating

transfer and forme cylinders 16, 17, 18, 19, or a second stop, which can be additionally brought into the actuating path of at least one of the two transfer cylinders 03, 04.

However, in a further development the transfer cylinder 16, 17 has been seated in such a way, and its movement toward the forme cylinder 18, 19 can be limited by a stop in such a way that, in the course of moving or pivoting the transfer cylinder 16, 17 into the print-on position in the third mode of operation, sufficient spacing is formed in the printing gap 02, and a suitable printing gap 21, 22 is formed between the forme and transfer cylinders 16, 17, 18, 19.

In an advantageous embodiment, each of the two printing groups 13, 14 have at least their own drive motor, not represented, for rotatory driving. With a respective drive in pairs, it can either drive the forme cylinder 18, 19, or both cylinders 16, 17, 18, 19 parallel, or the transfer cylinder 16, 17. A drive motor for each of the four cylinders 16, 17, 18, 19 can also be arranged.

The double printing group 11, which can be selectively operated in the direct lithographic process or in the offset process, preferably constitutes the last printing group 01 through which the web 06, 07 runs. It is assured in this way that the webs 06, 07 are not imprinted on this side, as long as they pass back to back through the double printing groups 01.

In the exemplary embodiment represented in Fig. 1, the five double printing groups 01, 11 are embodied as a so-called "tower of ten", wherein the uppermost double printing group 11 designed as a bridge printing unit 11 can be used, for example, for imprinting the web 06, 07, or webs, with a

decorative color. It is moreover advantageous if transfer cylinders 03, 04, 16, 17, which are assigned to each other, of at least two of the five double printing groups 01, 11 can be spaced apart from each other so that a web 06, 07 moving at production speed can be conducted between them without touching. In this case, by means of the printing press designed in this way (for example a tower of ten), it is possible to selectively imprint

- one web on both sides in five colors 5/5,
- two webs on one side with five colors 5/0 or 0/5,
- two webs with respectively four and one color 4/1 or 1/4,
- one web by means of an imprint process with 4/4 print.

In a further variation, not represented, a web 06, 07, which had previously been imprinted on one side by an offset process in one or several of the double printing groups 01, is conducted directly in the printing gap 21, 22, i.e. on the side of the latter facing the upstream located double printing group 01. Then this web 06, 07 is provided with an additional imprint (for example a decorative color, etc.) on the already imprinted side.



## List of Reference Symbols

01	Double printing group, printing group
02	Printing gap
03	Cylinder, transfer cylinder, rubber blanket cylinder, counter-pressure cylinder
04	Cylinder, transfer cylinder, rubber blanket cylinder, counter-pressure cylinder
05	Roll changer
06	Web, paper web
07	Web, paper web
08	Cylinder, forme cylinder
09	Cylinder, forme cylinder
10	-
11	Double printing group, bridge printing unit
12	Printing gap
13	Printing group
14	Printing group
15	-
16	Cylinder, transfer cylinder, counter-pressure cylinder
17	Cylinder, transfer cylinder, counter-pressure cylinder
18	Cylinder, forme cylinder
19	Cylinder, forme cylinder
20	-
21	Printing gap
22	Printing gap
23	Means, roller
24	Means, roller